Science, Technology, Engineering and Mathematics (STEM)
Educator Effectiveness Academy
Day 2 Summary

Overview:

The goal of Day 2 is to demonstrate how to integrate STEM into curriculum. STEM lessons will take a transdisciplinary approach. In this approach, curriculum and lessons are organized around student questions and concepts and skills are developed through real-life context (Drake and Burns, 2004). STEM lesson standards will align with:

- Common Core State Standards
- Maryland Technology Literacy Standards for Students (K-8)
- International Technology Education Association Standards (6-12)
- Maryland State Skills and Processes Core Learning Goals for Science

The STEM lessons outlined below focus on the concept of potential and kinetic energy. It exemplifies vertical alignment of lessons from K-12.

Elementary School STEM Lesson

Inquiry: How to design and construct a safer swing set?

Lesson Objectives:

1. Identify potential and kinetic energy through pictures.
2. Design and construct a simple pendulum.
3. Design and construct a safer swing set using pendulums as models.
4. Plan a transdisciplinary STEM energy lesson.

Middle School STEM Lesson

Inquiry: How to increase the speed of an amusement park ride?

Lesson Objectives:

1. Identify factors that could affect the speed of a pendulum.
2. Design and conduct an experiment to test the effect a selected variable has on the speed of a pendulum.
3. Apply potential energy and kinetic energy equations to an experimental design.
4. Plan a transdisciplinary STEM lesson.

High School STEM Lesson

Inquiry: How does energy transfer affect biological systems?

Lesson Objectives:

1. Demonstrate energy transfer using coupled pendulums.
2. Design and conduct an experiment to model synchronized oscillations.
3. Calculate the frequency of oscillation, potential energy, and kinetic energy for coupled and uncoupled pendulums.
4. Compare and contrast the frequency of oscillation, potential energy, and kinetic energy of uncoupled and coupled pendulums.
5. Relate coupled oscillation to biological synchronization.
6. Plan a transdisciplinary STEM lesson.